www.idosr.org Nemaliddle
©IDOSR Publication
International Digital Organization for Scientific Research ISSN: 2579-079X
IDOSR JOURNAL OF SCIENCE AND TECHNOLOGY 9(2):18-32, 2023.
https://doi.org/10.59298/IDOSR/JST/03.1.12002

# Evaluation of factors that affects the usage of insecticide treated mosquito nets in pregnant women at Ishaka

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**ABSTRACT**

This study was carried out in Kampala International University Teaching Hospital, Bushenyi District with the purpose of identifying the factors affecting the utilization of insecticide-treated mosquito nets (ITNs) among pregnant mothers. A descriptive and cross-sectional design was employed and 60 (sixty) respondents were selected using a convenient sampling method. Data was collected using a questionnaire. The study found that respondents faced various social factors affecting the utilization of ITNs among pregnant mothers and although all the respondents 60 (100%) had heard of ITNs and 60 (100%) understood ITNs as an insecticide-treated bed net that prevents mosquito bites, the majority of respondents 40 (66.7%) did not own an ITN while the majority 40 (66.7%) reported that they only sometimes slept under an ITN every night due to various factors including 14 (26.9%) causing too much heat, 12 (23.2%) said ITNs made it difficult to breathe, 8 (15.4%) disturbed to put up and down every night while 6 (11.5%) said it contained dangerous chemicals. In conclusion, the researcher noted that respondents faced various factors affecting the utilization of ITN among pregnant mothers and this hence required immediate intervention to put preventive measures in practice and reduce the spread of malaria among pregnant mothers in the study setting.

**Keywords:** Insecticide-treated mosquito nets, pregnant mothers, mosquito bites, malaria, chemicals.

## INTRODUCTION

Insecticide Treated Net (ITN) is a designed bed net with a drug to protect against mosquitoes that cause diseases e.g malaria [1-9]. Insecticide-Treated Nets (ITNs) are known to be highly effective in protecting against mosquitoes that cause malaria and have become an important tool in the prevention of malaria [10-15]. The ITN remained the most acknowledged tool in ensuring malaria prevention during pregnancy. Pregnant women using treated nets are less likely to have anemia and miscarriages [16-23]. The factors affecting ITN use are many and these include fear of chemicals contained in the ITNs, perceptions that it creates too much heat as well difficulty in breathing [14-16]. Globally, in most endemic areas of the world, pregnant women were the main adult risk group for malaria [17-20]. However, outside Africa, malaria infection rates in pregnant women were much lower and almost nonexistent, especially in developed countries such as the USA, France, and Germany [4, 10, 21]. In Africa, particularly the sub-Saharan part which is a tropical region, the incidence of malaria-related illnesses is high and therefore requires an effective measure in prevention because the poverty level coupled with knowledge gaps and poor technology cannot meet the treatment cost of the disease hence using the ITN becomes the priority [16-27]. In Sub-Saharan African countries including Nigeria, Cameroon, and Togo, had already started scaling up the free distribution of ITNs [28-34]. The African Summit on Roll Back Malaria in April 2000, adopting the Abuja declaration in which regional

leaders committed to ensuring that 60% of pregnant women in malaria-endemic communities be protected using effective preventive measures and appropriate treatment against malaria by the year 2005 advocated for three strategies, integrated for control of malaria in pregnancy among mothers [35-46]. In East African countries including Kenya and Tanzania, research trials in many malaria-endemic areas for the past 13 years had shown that widespread use of treated mosquito nets reduced maternal and infant morbidity and mortality caused by malaria [28]. This was because ITN use was simple, safe, cost-effective, and requires no sophisticated equipment nor technical expertise in using against exposure to mosquito bites which usually occurred during nights between 8.00 pm to 5.00 am when almost everyone was asleep [29].

**Statement of Problem**

An estimated 75,000 to 200,000 were associated with malaria infection in pregnancy [30]. In Africa, mortality due to malaria was highly prevalent and each year in malaria-prone regions of Africa, an estimated 10,000 pregnant women died as a result of malaria [31]. In Uganda, malaria accounted for 25-40% of all outpatient attendances, 20% of all admissions, and 14% of all in-patient deaths and because of the impact malaria had on morbidity and mortality in Uganda, thus effective malaria prevention was a top priority of the Ministry of Health [32]. Furthermore, reports by WHO [33] showed that Uganda had the world's highest malaria incidence, with a rate of 478 cases per 1000 population per year, yet malaria infection during pregnancy was the number one cause of miscarriage, stillbirth, premature birth, intrauterine growth retardation, and infertility and 90% of spontaneous abortions in Uganda were caused by malaria in pregnancy [3]. Pregnant women often moved long distances to seek treatment for malaria in health centers and hospitals where at times antimalarials were not available yet effective use of ITNs could prevent malaria during pregnancy [34]. The use of ITNs among pregnant women offers hope because they were effective for the prevention of malaria during pregnancy yet they were also very cost-effective. However, these benefits could only be achieved if mothers effectively utilized the ITNs [35]. Although efforts had been made by the government of Uganda, through the Ministry of Health to supply free insecticide-treated mosquito nets to pregnant mothers and the process was still ongoing, malaria remained prevalent among pregnant mothers, especially at Kampala International University Teaching Hospital. It was hence against this background that the researcher picked interest to carry out this study and identified the factors affecting the utilization of insecticide-treated mosquito nets among pregnant mothers attending ANC at Kampala International University Teaching Hospital.

**Aim of study**

The purpose of the study was to investigate the factors affecting the utilization of insecticide-treated mosquito nets among pregnant mothers attending ANC at Kampala International University Teaching Hospital in an effort to come up with practical measures to improve the utilization of ITNs by expectant mothers.

**Specific Objectives**

- To find out the social factors affecting the utilization of insecticide-treated mosquito nets among pregnant mothers attending ANC at KIUTH.
- To determine the economic factors affecting the utilization of insecticide-treated mosquito nets among pregnant mothers attending ANC at KIUTH.

**Research Questions**

- What are the social factors that affect the utilization of insecticide-treated mosquito nets among pregnant mothers attending ANC at KIUTH?
- What are the economic factors that affect the utilization of insecticide-treated mosquito nets among pregnant mothers attending ANC at KIUTH?

**Justification of the study**

This could benefit the Ministry of Health as well as health planners and policymakers

as it would enable them to plan and implement programs that ensure improved supply and utilization of ITNs among expectant mothers. The research had direct implications for health care service providers in Kampala International University Teaching Hospital as well as Uganda as a whole as they were encouraged to regularly sensitize and health educate expectant mothers about the importance of effective utilization of ITNs during pregnancy. This could benefit pregnant mothers at Kampala International University Teaching Hospital as well as other health facilities as they would receive improved sensitization and health education about the importance of ITN use during pregnancy. The study could provide a valuable point of reference for future researchers carrying out similar studies and also contribute to the available body of literature on the factors affecting the utilization of insecticide-treated mosquito nets among pregnant mothers attending ANC.

## METHODOLOGY

### Study Design

The study design was cross-sectional and descriptive, employing qualitative data collection techniques. This design was appropriate because the data required in the study was collected once and for all.

### Area of Study

The study was conducted at ANC clinic, Kampala International University Teaching Hospital which is located in Southwestern Uganda in Ishaka municipality, Bushenyi District. The hospital is found along Mbarara to Kasese highway about 77 km from Mbarara town and about 300 km from Kampala city. The hospital has a total of 390 beds and comprises of 104 Nurses and Midwives. It consists of administrative structures comprising of the executive director, deputy executive director, and various other heads of departments. It offers many health care services including family planning, child health services, obstetrics and emergency care, HIV/AIDS management services, general patient management, laboratory services, nutrition services, and antenatal services, ANC offers services like RCT, immunization, (TT), General Examination of the mother, screening of STI, Booking of all pregnant mothers, provision of mosquito nets. ANC is open from Monday to Friday from 8 am-5 pm. The study setting was selected because it was well known to the researcher and the required number of respondents was easy to get while the problem of malaria among pregnant mothers was noted on the ground.

### Study Population

The study targeted pregnant mothers attending ANC services at Kampala International University Teaching Hospital.

### Sample Size Determination

The study consisted of a sample of 60 respondents, all pregnant mothers attending ANC at Kampala International University Teaching Hospital. This sample size was selected because the researcher deems it representative enough of the study population. The sample size was determined by the use of Krejce and Morgan's (1970) sampling table below.

**Table 1: showing the sample size**

| N | S | N | S | N | S | N | S | N | S |
|---|---|---|---|---|---|---|---|---|---|
| 10 | 10 | 100 | 80 | 280 | 162 | 800 | 260 | 2800 | 338 |
| 15 | 14 | 110 | 86 | 290 | 165 | 850 | 265 | 3000 | 341 |
| 20 | 19 | 120 | 92 | 300 | 169 | 900 | 269 | 3500 | 246 |
| 25 | 24 | 130 | 97 | 320 | 175 | 950 | 274 | 4000 | 351 |
| 30 | 28 | 140 | 103 | 340 | 181 | 1000 | 278 | 4500 | 351 |
| 35 | 32 | 150 | 108 | 360 | 186 | 1100 | 285 | 5000 | 357 |
| 40 | 36 | 160 | 113 | 380 | 181 | 1200 | 291 | 6000 | 361 |
| 45 | 40 | 180 | 118 | 400 | 196 | 1300 | 297 | 7000 | 364 |
| 50 | 44 | 190 | 123 | 420 | 201 | 1400 | 302 | 8000 | 367 |
| 55 | 48 | 200 | 127 | 440 | 205 | 1500 | 306 | 9000 | 368 |
| 60 | 52 | 210 | 132 | 460 | 210 | 1600 | 310 | 10000 | 373 |
| 65 | 56 | 220 | 136 | 480 | 214 | 1700 | 313 | 15000 | 375 |
| 70 | 59 | 230 | 140 | 500 | 217 | 1800 | 317 | 20000 | 377 |
| 75 | 63 | 240 | 144 | 550 | 225 | 1900 | 320 | 30000 | 379 |
| 80 | 66 | 250 | 148 | 600 | 234 | 2000 | 322 | 40000 | 380 |
| 85 | 70 | 260 | 152 | 650 | 242 | 2200 | 327 | 50000 | 381 |
| 90 | 73 | 270 | 155 | 700 | 248 | 2400 | 331 | 75000 | 382 |
| 95 | 76 | 270 | 159 | 750 | 256 | 2600 | 335 | 100000 | 384 |

Note: "N" is Population Size
"S" is Sample Size.

Since the known study population was 75 mothers who attended ANC each day, the sample size was 63 mothers. However, this was revised downwards to 60 mothers which the researcher deemed representative enough of the study population. Hence, the sample size was 60mothers.

**Sampling procedure**

Due to the ready availability of respondents, the respondents for the study were selected by the use of simple random sampling procedure. In this procedure, the researcher wrote the words YES and NO on pieces of paper, folded them, placed them in an enclosed box, shook it and then offered potential respondents an opportunity to participate in the study by picking a piece of paper from the box. The box contained an equal number of 30 YES papers and 30 NO papers. Any respondent who picked a paper with the word YES written on it was requested to participate in the study. This continued until the total number of respondents to be interviewed per day was achieved. This method was used because it prevented bias and gave everyone an equal chance and opportunity to participate in the study.

**Inclusion criteria**

The study included only pregnant mothers attending ANC at Kampala International University Teaching Hospital who were available in the clinic during the data collection days and had voluntarily consented to participate in the study.

**Definition of Variables**

**Independent variables**

Social factors affecting utilization of ITNs
Economic factors affecting utilization of ITNs.

**Dependent variables**

Utilization of ITNs

**Research Instruments**

The researcher collected data from the respondents using a questionnaire which was developed and pre-tested before the study. It had both closed and open-ended questions and was written in English. This allowed respondents to open up, go deeper and give more meaningful responses to the questions asked. The researcher was also available to translate the tool for illiterate respondents.

**Data Collection**

The researcher administered the questionnaires to respondents from the ANC clinic at Kampala International University Teaching Hospitalor any other suitable, safe and convenient place within the hospital. This helped improve and

maintain privacy and confidentiality. Data was collected for 6 days and depending on the availability of respondents, the researcher interviewed at least 10 respondents per day.

### Data management

Data management included data editing before leaving the area of study to ensure that there were no mistakes or areas left blank, and any mistakes found were corrected before leaving the area of study. Data management also included double checking all the questionnaires for completion before losing contact with the respondents. Questionnaires were coded for easy identification. Data was stored under lock and key and only accessed by the researcher.

### Data analysis and presentation

The study data was first analyzed manually, by use of paper and pens and tallying. Data was presented in form of tables, graphs and pie charts using Microsoft Excel 2010.

### Ethical Considerations

A letter of introduction was obtained from the head of department, Kampala International University, Western Campus, introducing the researcher to the administration of Kampala International University Teaching Hospital and seeking permission to carry out the study. After permission was granted, the medical director introduced the researcher to the in-charge of the ANC clinic who introduced the researcher to the respondents. The study only commenced after the objectives of the study had been clearly and well explained to participants and they had understood and voluntarily consented to participate in the study. Respondents were assured of maximum confidentiality of all the information given and numbers were used instead of respondents' names.

## RESULTS

### Demographic and Social Characteristics

**Table 2: Demographic characteristics of respondents. n=60**

| **Age** | **Frequency** | **Percentage (%)** |
|---|---|---|
| 18 – 25 years | 30 | 50 |
| 26 – 35 years | 17 | 28.3 |
| 35 years and above | 13 | 21.7 |
| **Total** | **60** | **100** |
| **Level of education** | **Frequency** | **Percentage (%)** |
| No formal education | 22 | 36.7 |
| Primary level | 16 | 26.7 |
| Secondary level | 14 | 23.3 |
| Tertiary level | 8 | 13.3 |
| **Total** | **60** | **100** |
| **Occupation** | **Frequency** | **Percentage (%)** |
| House wife | 30 | 50 |
| Professional | 8 | 13 |
| Peasant farmer | 12 | 20 |
| Self employed | 10 | 17 |
| **Total** | **60** | **100** |
| **Marital status** | **Frequency** | **Percentage (%)** |
| Single | 10 | 16.7 |
| Married | 50 | 83.3 |
| **Total** | **60** | **100** |

Results showed that half of the respondents 30 (50%) were in the age range of 18 – 25 years, 17 (28.3%) were in the age range of 26 – 35 years while the least 13 (21.7%) were 35 years and above. Findings show that 22 (36.7%) respondents had not attained any formal education, 16 (26.7%) attained primary level education, 14 (23.3%) attained secondary level education and 8 (13.3%) attained tertiary level education. Half of the respondents30 (50%) were house wives, 12 (20%) were peasant farmers, 10 (17%) were self-employed and 8 (13%) were professionals. The majority of

respondents 50 (83.3%) were married while the least 10 (16.7%) were single.

**Social factors affecting utilization of ITNs among pregnant mothers**

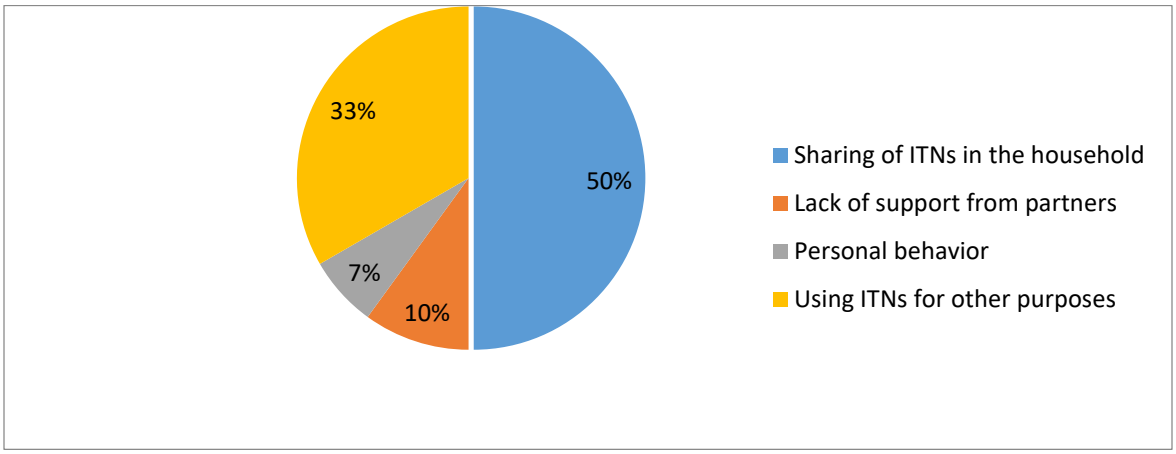


**Figure 1: Social factors that affect the use of ITNs. n=60**

Half of the respondents 30 (50%) reported sharing of ITNs in the household, 20 (33.3%) using ITNs for other purposes, 6 (10%) reported lack of support from partners while the least 4 (6.7%) mentioned personal behavior.

**Table 3: Distribution of respondents who had ever heard of ITNs, understanding of ITNs, respondents who had ITNs as well as whether respondents slept under ITNs every night n=60**

| **Responses** | **Frequency** | **Percentage (%)** |
|---|---|---|
| Yes | 60 | 100 |
| No | 0 | 0 |
| **Total** | **60** | **100** |
| **Understanding of ITNs** | **Frequency** | **Percentage (%)** |
| An insecticide treated bed net which prevents mosquito bites | 60 | 100 |
| **Total** | **60** | **100** |
| **ITN ownership** | **Frequency** | **Percentage (%)** |
| Yes | 20 | 33.3 |
| No | 40 | 66.7 |
| **Total** | **60** | **100** |
| **Responses** | **Frequency** | **Percentage (%)** |
| Sometimes | 40 | 66.7 |
| Always | 12 | 20 |
| Never | 8 | 13.3 |
| **Total** | **60** | **100** |

All of the respondents 60 (100%) had ever heard of ITNs and 60 (100%) understood ITNs as an insecticide treated bed net which prevents mosquito bites. The majority of respondents 40 (66.7%) did not own an ITN while the least 20 (33.3%) owned an ITN. Most respondents 40 (66.7%) reported that they sometimes slept under an ITN every night, followed by 12 (20%) who said they always sleep under an ITN every night while the least 8 (13.3%) never slept under an ITN.

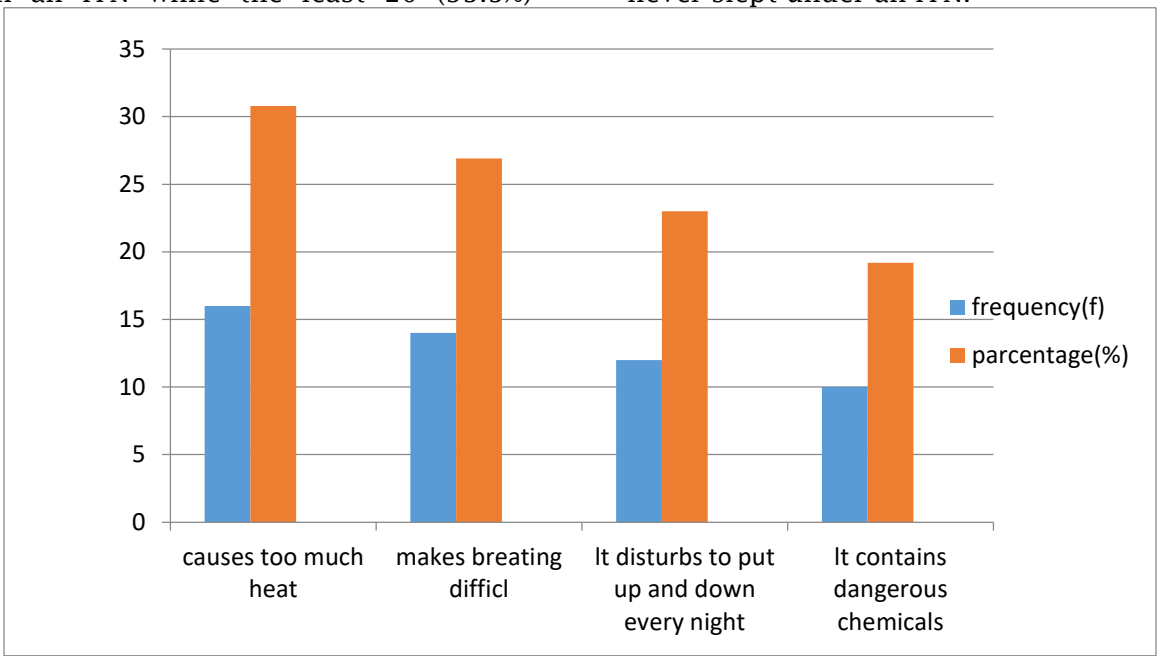


**Figure 2: Reasons for not sleeping under an ITN every night n=52**

Out of the 52 respondents who did not ensure that they slept under ITNs every night, most 16 (30.8%) said the ITNs caused too much heat, followed by 14 (26.9%) who said the ITNs made it difficult to breathe, 12 (23%) said it disturbed to put up and down every night while the least 10 (19.2%) said it contained dangerous chemicals.

**Table 4: Whether effective use of ITNs during pregnancy reduce the spread of malaria and social factors affecting utilization of ITNs among pregnant mothers n=60**

| Responses | Frequency | Percentage (%) |
|---|---|---|
| Yes | 40 | 66.7 |
| No | 20 | 33.3 |
| **Total** | **60** | **100** |

Most respondents 40 (66.7%) agreed that effective use of ITNs during pregnancy reduced the spread of malaria because it prevented mosquito bites while the least 20 (33.3%) disagreed.

**Economic factors affecting utilization of ITNs among pregnant mothers**

**Table 5: What respondents did to earn a living, whether income is enough to purchase household items such as ITNs, whether all household members own ITNs, n=60**

| Occupation | Frequency | Percentage (%) |
|---|---|---|
| Peasant farmer | 24 | 40 |
| Self employed | 20 | 33.3 |
| Casual labourer | 16 | 26.7 |
| **Total** | **60** | **100** |
| **Whether income is enough to purchase items such as ITNs** | **Frequency** | **Percentage (%)** |
| Yes | 24 | 40 |
| No | 36 | 60 |
| **Total** | **60** | **100** |
| **Whether all household members own ITNs** | **Frequency** | **Percentage (%)** |
| Yes | 20 | 33.3 |
| No | 40 | 66.7 |
| **Total** | **60** | **100** |

Results showed that 24 (40%) were peasant farmers, 20 (33.3%) were self-employed while the least were casual laborers. The majority of respondents 36 (60%) reported that their income was not enough to purchase items such as ITNs while the least 24 (40%) said it was enough. Results showed that most respondents 40 (66.7%) reported that not all their house hold members owned ITNs while the least 20 (33.3%) said all their household members owned ITNs.

**Table 6: Number of ITNs owned in the household, whether ITNs are shared when sleeping and number of people sharing each ITN. n=20**

| Responses | Frequency | Percentage (%) |
|---|---|---|
| 1 ITN | 4 | 20 |
| 2 – 3 ITNs | 10 | 50 |
| More than 3 ITNs | 6 | 30 |
| **Total** | **20** | **100** |
| **Sharing of ITNs** | **Frequency** | **Percentage (%)** |
| Yes | 15 | 75 |
| No | 5 | 25 |
| Total | 20 | 100 |
| **Number of people sharing each ITN** | **Frequency** | **Percentage (%)** |
| 2 – 3 | 10 | 66.7 |
| 3 people and more | 5 | 33.3 |
| **Total** | **15** | **100** |

The majority of respondents 10 (50%) reported owning 2 – 3 ITNs in their household, 6 (30%) reported owning more than 3 ITNs while the least 4 (20%) reported owning 1 ITN. Most respondents 15 (75%) reported that ITNs where shared in their household when sleeping while the least 5 (25%) did not share them. Most respondents 10 (66.7%) reported that each ITN was shared between 2-3 people while the least 5 (33.3%) said it was shared by 3 people and more.

## DISCUSSION

**Demographic and Social Characteristics**

Results showed that half of the respondents 30 (50%) were in the age range of 18 – 25 years, 17 (28.3%) were in the age range of 26 – 35 years. This demonstrated that most respondents were relatively young and this could affect their awareness and utilization of ITN during pregnancy due to inexperience. Findings showed that 22 (36.7%) respondents had not attained any formal education, 16 (26.7%) attained primary-level education, which demonstrated that most respondents had attained little or no education and this could affect their level of knowledge and awareness about factors affecting utilization of ITN among pregnant women attending ANC. This study was in line with Dahesh *et al.* [36], who mentioned in a study about the economic factors affecting the utilization of insecticide-treated mosquito nets among pregnant mothers attending ANC in Fayoum Governorate, Egypt that malaria infection among pregnant mothers increased with the decrease of the socioeconomic level of families as well as the low level of educational attainment of the mothers (67%). For instance, those of low levels of educational attainment did not know the importance of effective use of ITNs during pregnancy while those of low socio-economic status could not afford to purchase ITNs for all members of their household. Half of the respondents 30 (50%) were housewives, 12 (20%) were peasant farmers, which implied that most respondents were not involved in any income-generating activity and thus relied on their husbands/partners to ensure adequate access to health care services.

**Social factors affecting utilization of ITNs among pregnant mothers**

Half of the respondents 30 (50%) reported sharing of ITNs in the household as a social factor affecting use of ITNs, 20 (33.3%) using ITNs for other purposes, 6 (10%) reported lack of support from partners while the least 4 (6.7%) mentioned personal behavior. This shows that most respondents were adequately aware of the factors affecting ITN use which implied that they could come up with solutions to improve the use of ITNs in the homesteads. All of the respondents 60 (100%) had ever heard of ITNs and 60 (100%) understood ITNs as insecticide-treated bed net which prevents mosquito bites, however, the majority of respondents 40 (66.7%) did not own an ITN which demonstrated that despite awareness of ITNs, ownership of ITNs remained very low and this needed to be improved upon in an effort to reduce the rate of malaria among pregnant mothers. Most respondents 40 (66.7%) reported that they sometimes slept under an ITN every night. This study is in line with a study by Tshikuka *et al.* [37], about multiple infections with Plasmodium and helminths in communities of low and relatively high socio-economic status reveals that economic factors affecting the utilization of insecticide-treated mosquito nets among pregnant mothers attending ANC was the inability to afford or purchase enough insecticide-treated bed nets for the entire household (65%) due to large families and low incomes, thus exposing pregnant mothers to the dangers of malaria infection during pregnancy. Out of the 52 respondents who did not ensure that they sleep under ITNs every night, most 16 (30.8%) said the ITNs caused too much heat, 12 (23%) said it disturbed to put up and down every night while the least 10 (19.2%) said it contained dangerous chemicals. This demonstrated that various reasons affecting the use of ITNs among pregnant women existed which required addressing. This study is in line with a study by Achan *et al.* [32] who documented in a study about prophylaxis and treatment of malaria in HIV-infected populations, pregnant women did not have positive attitudes towards the utilization of anti-malarial procedures such as the consistent use of insecticide-treated bed nets as they believed that ITNs contained dangerous chemicals (55%) which could harm them and their children. Results showed that 12 (23.2%) respondents reported that ITNs made it difficult to breathe which was not different from the findings of Idowu *et al.* [38], who documented in a survey of pregnant women in Abeokuta, Nigeria about anemia

in pregnancy, findings reveal that pregnant mothers reported that ITNs are difficult to put up and down every night (49%) and also made it difficult to breathe (50%) which was found to be a factor affecting utilization of insecticide-treated mosquito nets. Most respondents 40 (66.7%) agreed that effective use of ITNs during pregnancy reduced the spread of malaria because it prevented mosquito bites which demonstrated that most respondents were aware of the importance of using IPT during pregnancy. This study is in line with Mugisha *et al.* [39], who documented in a study examining out-of-pocket expenditure on health care in Nouna, Burkina Faso, and implications for health policy, findings revealed that socio-economic factors leading to the spread of malaria were many. It was further revealed that women and children were exposed to mosquito bites while weeding bean fields while men were less exposed because they spent much of the evening away from home and only return late at night. More than half of the respondents 32 (53.3%) reported lack of interest as a social factor affecting the utilization of ITNs among pregnant mothers, followed by 18 (30%) who said they feared chemicals in the ITNs while the least 10 (16.7%) mentioned lack of awareness. This demonstrated that despite awareness of the benefits of effective utilization of ITNs, there were various reasons as to why the ITNs were not adequately and effectively used by pregnant women. This study was in agreement with Duffy & Fried [40], who reported in their study about malaria in the pregnant woman that among the pregnant mothers interviewed in the study, pregnant mothers reported that ITNs caused discomfort and too much heat when used at night (81%) and this was one of the major factors affecting utilization of insecticide-treated mosquito nets among pregnant mothers.

**Economic factors affecting utilization of ITNs among pregnant mothers**

Results showed that 24 (40%) were peasant farmers, 20 (33.3%) were self-employed and the least were casual laborers. This showed that respondents were of low economic status and this could affect their ability to own and use ITNs for malaria prevention. This study was in line with another study which further showed that a low social economic status led to a much-reduced health budget and gross inadequacy of funds for drugs as well as accessing health care services. Furthermore, it was revealed that high birth rates led to a rapid increase in the susceptible population and this, coupled with poor health-seeking behavior results in higher risks of morbidity and mortality associated with malaria infection [41]. The majority of respondents 36 (60%) reported that their income was not enough to purchase items such as ITNs which implied that since they could not purchase ITNs, many would remain highly predisposed to the risk of malaria infection. This showed that malaria infection was expensive to treat and this could affect the reduction of malaria infection especially for those who are suffering from poverty. Adverse socioeconomic conditions were documented as one of the leading contributors to malaria infection by [42]. It was further shown that a low social economic status led to a much-reduced health budget and gross inadequacy of funds for drugs as well as accessing health care services. Furthermore, it was revealed that high birth rates led to a rapid increase in the susceptible population and this, coupled with poor health-seeking behavior results into higher risks of morbidity and mortality associated with malaria infection [41].Results showed that most respondents 40 (66.7%) reported that not all their household members owned ITNs. This showed that poverty was one of the major factors affecting use of ITNs in the study setting. This study is in line with Yapabandara *et al.* [43], who reported low social economic status of mothers increases the morbidity and mortality of these children due to malaria. It was noted that malaria infection rates increased three-fold among those who lived in muddy or badly constructed houses near the breeding places. However, it was also revealed that there was a relationship between malaria infection and household wealth, thus the lower the household wealth, the higher the risks of malaria. The

majority of respondents 10 (50%) reported owning 2 – 3 ITNs in their household, 6 (30%) reported owning more than 3 ITNs. Most respondents 15 (75%) reported that ITNs were shared in their household when sleeping with 10 (66.7%) reporting that each ITN was shared between 2 – 3 people. This demonstrated that ITN ownership remained very low and yet still, those who owned them shared them which further predisposed to the risk of malaria infection. The majority of respondents 40 (66.7%) reported that not all their household members owned ITNs which demonstrated that ITN ownership was very low among respondents and their household members in the study setting, a situation that could lead to increased rates of malaria cases among pregnant mothers.

## CONCLUSION

The study found that respondents faced various social factors affecting the utilization of ITNs among pregnant mothers and although all the respondents had ever heard of ITNs and understood ITNs as an insecticide-treated bed net that prevents mosquito bites, the majority of respondents did not own an ITN and reported that they only sometimes slept under an ITN every night due to various factors including ITNs causing too much heat, difficulty to breathe, disturbed to put up and down every night and contained dangerous chemicals. Respondents faced various economic factors affecting the utilization of ITNs among pregnant mothers and although respondents were involved in various activities, their income was little and they could not purchase enough ITNs for each household member, hence leading to sharing of ITNs and increased exposure to malaria infection.

**Recommendations to the Ministry of Health**

The Ministry of Health should emphasize its sensitization programs for pregnant mothers on the dangers of malaria during pregnancy as well as how it could be prevented.

**Recommendations for health workers at Kampala International University Teaching Hospital**

Health workers at Kampala International University Teaching Hospital should endeavor to regularly sensitize and health educates pregnant mothers about the dangers of malaria during pregnancy as well as the importance of effective malaria prevention. Health workers should further endeavor to effectively provide fansidar and encourage pregnant mothers to take all the recommended doses to effectively prevent malaria. Health workers should emphasize use of IPT as well as ITNs as preventive measures of malaria during pregnancy.

Health workers should ensure that pregnant mothers at Kampala International University Teaching Hospital take all the recommended doses of fansidar during pregnancy and hence avoid all the potential complications associated with malaria during pregnancy.

**Recommendations for mothers in Kampala International University Teaching Hospital**

Mothers in Kampala International University Teaching Hospital should ensure that they adequately use IPT during pregnancy as a preventive measure of malaria infection. They should also ensure that they always sleep under ITNs every night and also ensure that they have good sanitation around their homes including removing any stagnant water and slashing bushes around or near the home. Mothers should have good health-seeking behavior for malaria screening and treatment services upon noticing any signs and symptoms of malaria infection. Implications to nursing practice. Health workers, especially those in Kampala International University Teaching Hospital can play an important role in the reduction of malaria infection rates among pregnant mothers. This can be achieved through the effective provision of IPT to pregnant mothers as well as continuing the sensitization and health education of mothers about the importance of ensuring the effective use of ITNs every night as well as adequate sanitation near or around their homes.

## REFERENCES


[1]. Okethwangu, D., Rutazaana, D., Kyabayinze, D., Birungi, D., Biribawa, C., Kwesiga, B., & Opigo, J. (2020). Patterns Of Insecticide Resistance Among Anopheles Gambiae Mosquitoes in Five Districts In Uganda: 2011-2015.

[2]. Josephat, M. N., Samuel, M. A., Rael, M., John, O., Baraza, A., Pacifica, B., & Mfitundinda, W. (2022). Influence of Vector Control and Chemotherapy Interventions on Treatment Outcomes and Parasite Incidence in Artemether Combined Therapies Treated Populations of Kisii County, Kenya. *International Journal of Tropical Disease & Health*, 43(10), 27-42.

[3]. MoH, (2013). Uganda National Infection Prevention and Control Guidelines.

[4]. Egwu, C. O., Aloke, C., Chukwu, J., Agwu, A., Alum, E., Tsamesidis, I, Aja, P. M., Offor, C. E., & Obasi, N. A. A. (2022). world free of malaria: It is time for Africa to actively champion and take leadership of elimination and eradication strategies. *Afri Health Sci.*,22(4). 627-640.

[5]. Hassan, A. O., Oso, O. V., Obeagu, E. I., & Adeyemo, A. T. (2022). Malaria Vaccine: Prospects and Challenges. *Madonna University Journal of Medicine and Health Sciences*, *2*(2), 22-40.

[6]. Adehin, A., Igbinoba, S. I., Soyinka, J. O., Onyeji, C. O., Babalola, C. P., & Bolaji, O. O. (2019). Pharmacokinetic parameters of quinine in healthy subjects and in patients with uncomplicated malaria in Nigeria: analysis of data using a population approach. *Current Therapeutic Research*, 91, 33-38.

[7]. Alaii, J., Hawley, W., Kolczak, M., terKuile, F., Gimnig, J., Vulule, J., Odhacha, A., Oloo, A. Nahlen, B., & Phillips-Howard, P. (2010). Factors affecting use of permethrin-treated bed nets during a randomized controlled trial in western Kenya. *Am J Trop Med Hyg*, 68**:**137-141.

[8]. Obeagu, E. I., Bot, Y. S., Obeagu, G. U., Alum, E. U., & Ugwu, O. P. C. (2023). Anaemia and risk factors in lactating mothers: a concern in Africa. *International Journal of Innovative and Applied Research,* **11**(02): 15-17.

[9]. Ifeanyi, O. E., Uzoma, O. G., Amaeze, A. A., Ijego, A. E., Felix, C. E., Ngozi, A. F., & Chinenye, K. S. (2020). Maternal expressions (serum levels) of alpha tumour necrosis factor, interleukin 10, interleukin 6 and interleukin 4 in malaria infected pregnant women based on parity in a Tertiary Hospital in Southeast, Nigeria. *Journal of Pharmaceutical Research International*, 32(23), 35-41.

[10]. Ekpono, E. U., Aja, P. M., Ibiam, U. A., Alum, E. U., & Ekpono, U. E. (2019). Ethanol Root-extract of *Sphenocentrum jollyanum* Restored Altered Haematological Markers in *Plasmodium berghei*-infected Mice. *Earthline Journal of Chemical Sciences,* **2**(2):189-203.

[11]. Okamgba, O. C., Nwosu, D. C., Nwobodo, E. I., Agu, G. C., Ozims, S. J., Obeagu, E. I., & Ifeanyichukwu, M. O. (2017). Iron Status of Pregnant and Post-Partum Women with Malaria Parasitaemia in Aba Abia State, Nigeria. *Annals of Clinical and Laboratory Research*, *5*(4), 206.

[12]. Ifeanyi, O. E., Chibunna, O. M., Braxton, N. A. Q., & Uche, E. C. (2014). Impact of Plasmodium falciparum malaria and hookworm infection on anaemia among pregnant women of ikwuano local government area, Abia state, Nigeria. *Int J Curr Microbiol Appl Sci*, 3(1), 104-11.

[13]. Aygepong, I. A., & Manderson, L. (2013). Mosquito avoidance and bed net use in the Greater Accra Region, Ghana. *J. Biosoc. Sci.,* 31: 79 – 92.

[14]. Egwu, C.O., Aloke, C., Chukwu, J., Nwankwo, J.C., Irem, C., Nwagu, K. E., Nwite, F., Agwu, A. O., Alum, E., Offor, C. E., & Obasi, N.A. (2023. Assessment of the Antimalarial Treatment Failure in Ebonyi State,

Southeast Nigeria. *J. Xenobiot.*, 13, 16–26.

[15]. Bwanika, R., Kato, C. D., Welishe, J., & Mwandah, D. C. (2018). Cytokine profiles among patients co-infected with Plasmodium falciparum malaria and soil borne helminths attending Kampala International University Teaching Hospital, in Uganda. *Allergy, Asthma & Clinical Immunology*, 14(1), 1-9.

[16]. Hamel, M. J., Odhacha, A., Roberts, J. M., & Deming, M. S. (2013). Malaria control in Bungoma District, Kenya: a survey of home treatment of children with fever, bed net use and attendance at antenatal clinics. *Bull World Health Organ*, 79:1014-1023.

[17]. Maniga, J. N., Rael, M., Bwogo, P., Ntulume, I., Tibyangye, J., Atiku, S. M., & Mong'are, S. (2021). In-vivo efficacy profiles of plasmodium falciparum to Artemether-Lumefantrine, the recommended first-line treatment of uncomplicated Malaria in Kisii County Kenya. *South Asian Journal of Parasitology*, 5(4): 114-128.

[18]. Nyabayo Maniga, J., Aliero, A. A., Ntulume, I., Okech, M. A., & Claire Mack, M. (2018). Plasmodium falciparum malaria clinical and parasitological outcomes after in-vivo Artemether-Lumefantrine (AL) treatment at Bushenyi District Uganda. *International Journal of Tropical Disease & Health*, 29(3): 1-17.

[19]. Maniga, J. N., Emmanuel, E., Onkoba, S. K., Aliero, A. A., Miruka, C. O., & Micheni, L. N. (2015). Drug resistant plasmodium falciparum parasites: a review of the resistance and failure of malaria eradication. *IJBAMR*, 5 (1),253-261.

[20]. Ugwu, O. P., Nwodo, O. F., Joshua, P. E., Odo, C. E., Bawa, A., Ossai, E. C., & Adonu, C. C. (2013). Anti-malaria and hematological analyses of ethanol leaf extract of Moringa oleifera on malaria-infected mice. *International Journal of Pharmacy and Biological Science*, *3*(1), 360-371.

[21]. Cottrell, G., Deloron, P., Fievet, N., Sow, S., Gaye, O., & Le Hesran, J. Y. (2012). Prediction of Plasmodium falciparum placental infection according to the time of infection during pregnancy. Acta Trop., 98(3):255-260.

[22]. Kajoba, D., Ivan Egesa, W., Jean Petit, H., Omar Matan, M., Laker, G., Mugowa Waibi, W., & Asiimwe, D. (2021). Congenital malaria in a 2-day-old neonate: a case report and literature review. *Case Reports in Infectious Diseases*, 1-4.

[23]. Marcelline, U., Noella, U., Tharcisse, M., Corine, K., Josephat, M., & Jonh Banson, B. (2016). The impact of malaria and gastrointestinal helminthiasis co-infection on Anaemia and severe malaria among children in Bugesera District, Rwanda. *Int J Trop Dis Heal*, 13(4).

[24]. Obeagu, E. I., Ogbonna, U. S., Nwachukwu, A. C., Ochiabuto, O., Enweani, I. B., & Ezeoru, V. C. (2021). Prevalence of Malaria with Anaemia and HIV status in women of reproductive age in Onitsha, Nigeria. *Journal of Pharmaceutical Research International*, *33*(4), 10-19.

[25]. Okorie, H. M., Obeagu, E. I., Eze, E. N., & Jeremiah, Z. A. (2018). Assessment of some haematological parameters in malaria infected pregnant women in Imo state Nigeria. *Int. J. Curr. Res. Biol. Med*, *3*(9), 1-14.

[26]. Ogah, A.O., Ezeonwumelu, J. O. C., Okoruwa, A.G., Adiukwu, C.P., & Ajayi, A. M. (2013). Manifestations of severe malaria among the under-five children attending Kampala international university teaching hospital, Bushenyi, western Uganda: pilot study. *British Journal of Pharmacology and Toxicology,* 4 (4), 128-135

[27]. Macintyre, K., Keanting, J., Sosler, S., Kibe, L., Mbogo, C. M., Githeko, A. K., & Beir, J. C. (2012). Examining the determinants of mosquito-avoidance practices in Two Kenyan Cities. Malar. J., 1: 1-17.

[28]. Okia, M., Hoel, D. F., Kirunda, J., Rwakimari, J. B., Mpeka, B., Ambayo,

D., Price, A., Oguttu, D. W., Okui, A. P., & Govere, J. (2018). Insecticide resistance status of the malaria mosquitoes: Anopheles gambiae and Anopheles funestus in eastern and northern Uganda. Malar J. 17(1):157. doi: 10.1186/s12936-018-2293-6. PMID: 29625585; PMCID: PMC5889576.

[29]. UNICEF Office of Research (2013). 'Child Well-being in Rich Countries: A comparative overview', Innocenti Report Card 11, UNICEF Office of Research, Florence.

[30]. Takem, E. N., & D'Alessandro, U. (2013). Malaria in pregnancy. Mediterr J Hematol Infect Dis., 5(1): e2013010. doi: 10.4084/MJHID.2013.010. Epub 2013 Jan 2. PMID: 23350023; PMCID: PMC3552837.

[31]. Gamble, C., Ekwaru, P. J., Garner, P., & Kuile, F. O. (2007). Insecticide-treated nets for the prevention of malaria in pregnancy: a systematic review of randomised controlled trials. *PLoS Med.,* 4:e107.

[32]. Achan, J., Gasasira, A.F., Aweeka, F., Havlir, D., Rosenthal, P.J., & Kamya, M.R. (2012). Prophylaxis and treatment of malaria in HIV-infected populations. Future HIV Therapy, 2(5), 453-464.

[33]. WHO (2014). World Malaria report 2010. Geneva, World Health Organization

[34]. Coker, W., Chukwuani, H.A.B., Ifudu, C. M., & Aina, H.D. (2011). The malaria scourge. Concepts in disease management. *Niger. J. pharm.*, 32: 19-48.

[35]. Kiwanuka, G. N. (2013). Malaria morbidity and mortality in Uganda. J Vector Borne Dis., 40(1-2):16-19.

[36]. Dahesh, S.M., Bassiouny, H.K., & El-Masry, S.A. (2009). Socioeconomic and environmental factors affecting malaria infection in Fayoum Governorate, Egypt. *J Egypt Soc Parasitol.,* 39(2):511-23.

[37]. Tshikuka, J. G., Scott, M. E., Gray-Donald, K., & Kalumba, O. N. (2010). Multiple infection with Plasmodium and helminths in communities of low and relatively high socio-economic status. *Ann Trop Med Parasitol.*, 90: 277-93.

[38]. Idowu, O.A., Mafiana, C.F., Sotiloye, D. (2012). Anemia in pregnancy: A survey of pregnant women in Abeokuta, Nigeria. *ActaObstetriciaet Gynecologica Scandinavica*, 35(4), 19–26.

[39]. Mugisha, F., Kouyate, B., Gbangou, A., & Sauerborn, R. (2012). Examining out of-pocket expenditure on health care in Nouna, Burkina Faso: implications for health policy. *Trop Med Int Health*, 7: 187-96.

[40]. Duffy, P.E., & Fried, M. (2010). Malaria in the pregnant woman. Curr Top Microbiol Immunol., 295:169-200.

[41]. Slutsker, L. & Kachur, S.P. (2013). It is time to rethink tactics in the fight against malaria. *Malar J,* **12**, 140.

[42]. Lvovsky, K. (2012). Environment, Health, and Poverty. Environmental Strategy No.1: 1-4.

[43]. Yapabandara, A. M., Curtis, C. F., Wickramasinghe, M. B., & Fernando, W. P. (2011). Control of malaria vectors with insect growth regulator pyriproxyfen in a gem-mining area in Sri-Lanka. *Acta Tropica*, 80: 265-76.

[44]. Byabashaija, J. (2023).Prevalence of Malaria among Pregnant Women Attending Antenatal Clinic at Ishaka Adventist Hospital, Uganda. *IDOSR Journal of Experimental Sciences,* 9 (1), 59-67.

[45]. Mugoya,M. P. (2023).Prevalence and control of Malaria in Pregnant Antenatal Mothers at Main Hospital, Iganga District, Eastern Uganda. IDOSR *Journal of Science and Technology* 9(1):66 9 (1), 66-74.

[46]. Mugerwa, R. (2023).Antenatal Care Services among Pregnant Women in Kampala International University Teaching Hospital Bushenyi-Ishaka Municipality. *INOSR Scientific Research* 9 (1), 38-49.

**Nemalidde Lydia (2023). Evaluation of factors that affects the usage of insecticide treated mosquito nets in pregnant women at Ishaka.**
**IDOSR JOURNAL OF SCIENCE AND TECHNOLOGY 9(2):18 -32, 2023.**
**https://doi.org/10.59298/IDOSR/JST/03.1.12002**